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# POSSIBLE GROUSE DAMAGE ON TRUE FIRS

*by Carroll B. Williams, Jr.*

## INTRODUCTION

Wildlife damage to coniferous seedlings and saplings frequently interferes with regeneration of forests in the Pacific Northwest. Radwan (1963)[1/] reviewed the literature and summarized research on wild mammal damage to forest trees, but there has been little documentation of grouse damage or control. This paper documents the author's observations of debudded true firs and associated species near Mount Hood, Oregon, during the spring of 1964. There is strong circumstantial evidence that the damage was caused by grouse.

Grouse normally inhabit forest lands, and population increases on recently logged and burned areas have been recorded (Hatter 1955). Grouse eat buds and needles of seedlings thus impeding height growth of the injured trees (Lawrence et al. 1961). Douglas-fir (*Pseudotsuga menziesii* (Mirb.) Franco) is a preferred food of grouse throughout the year in the Pacific Northwest (Martin et al. 1951). Plantations of Douglas-fir seedlings on Vancouver Island have been subject to heavy and repeated damage by sooty blue grouse (*Dendragapus obscurus fuliginosus* Ridgeway), particularly in the spring (Fowle 1960). However, damage to saplings and larger trees has, so far, not been reported to be important.

Grouse damage to true firs and associated upper-slope species in the Pacific Northwest has not been previously reported, although at least two studies of feeding habits mention a preference for true fir needles.

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1/ Names and dates in parentheses refer to Literature Cited, p. 6.

Beer (1943) reported that at high elevations in Washington and northern Idaho grouse preferred true fir, although many Douglas-fir were present. Stomach analyses of sooty blue grouse from areas containing true firs also have shown that the birds feed largely on true fir needles, although Douglas-fir needles are consumed in appreciable quantities, too (Beer 1943; Stewart 1944).

## STUDY AREA

An old burn, situated 2 miles west of Government Camp, Oregon, and 4 to 5 miles southwest of Mount Hood, is the site of a seasonal height-growth study of coniferous saplings. It is surrounded by a mature forest of Douglas-fir, western hemlock (*Tsuga heterophylla* (Raf.) Sarg.), and western redcedar (*Thuja plicata* Donn). The area experiences much cold air drainage down the snow-covered slopes of Mount Hood, and frost occurs at any time of the year. The wide assortment of tree species growing on the old burn suggests that it may be a tension zone between the Douglas-fir forest below and the upper-slope or subalpine forests above. Natural regeneration of Douglas-fir, western hemlock, mountain hemlock (*T. mertensiana* (Bong.) Carr.), western redcedar, noble fir (*Abies procera* Rehd.), Pacific silver fir (*Abies amabilis* (Dougl.) Forbes), subalpine fir (*Abies lasiocarpa* (Hook.) Nutt.), western white pine (*Pinus monticola* Dougl.), Engelmann spruce (*Picea engelmannii* Parry), ponderosa pine (*Pinus ponderosa* Laws.), and lodgepole pine (*Pinus contorta* Dougl.) occurs mixed in seedling to pole sizes. Sooty blue grouse were often heard and occasionally seen during the summers of 1963 and 1964.

## OBSERVATIONS

In the spring of 1964, the author visited the area to begin a second season's leader-growth measurement on coniferous saplings. The terminal and, often, many lateral buds were missing on numerous study trees as well as those in the surrounding stand (fig. 1). Injured trees ranged from approximately 5 feet to over 30 feet in height. Damage was particularly noticeable on trees in a powerline right-of-way that bisected the southern third of the area.

Comparison of the leader measurement with that of the preceding year showed that only the buds were cleanly nipped off. Comparison of the injuries with damage descriptions in a key to wildlife injuries to seedlings and saplings (Lawrence et al. 1961) points clearly to grouse as the damaging agent. The type of damage, its occurrence on trees up to 30 feet tall, and its concentration in seedling stands within a right-of-way are signs of grouse presence. The location of the study area coupled with these grouse signs indicates a grouse

wintering area. Samples of the injury were examined by mammalogists[2/] at Oregon State University and tentatively identified as grouse damage.

A 12- to 15-foot accumulation of snow was reported on the area during the winter and spring of 1963-64.[3/] Apparently, the high snow

*Figure 1.--A clump of Pacific silver fir saplings (A) and a noble fir sapling (B) exhibiting animal damage--removal of terminal buds. Both photos were taken July 19, 1964. By this time, several of the top lateral branches on the noble fir were beginning to turn upward. No lateral branches of any Pacific silver fir did so during the 1964 growing season.*

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[2/] Edward Hooven and Hugh Black, forest wildlife ecologists, Oregon Forest Research Laboratory, examined the damage specimens collected by the author.

[3/] Personal communication with Raymond Steiger, Assistant Ranger, Zigzag District, Mount Hood National Forest, June 4, 1964.

accumulations forced the grouse to feed on the terminal and top lateral buds of the taller trees that were not covered. As the snow melted, grouse were able to feed on progressively smaller trees.

Some tree species showed a greater incidence of damage than others. The true firs and pines, which have fairly large terminal buds, received the most damage. Apparently, grouse concentrated on trees with large attractive buds. In order to check this seeming preference for true firs and pines, a 100-percent survey for incidence of grouse damage was made on all trees growing within a half chain of the powerline for a distance of approximately 720 feet (table 1).

Table 1.--Incidence of possible grouse damage to coniferous saplings near Government Camp, Oreg., 1964 [1/]

| Tree species | Total trees | Damaged trees | |
|---|---|---|---|
| | Number | Number | Percent |
| Pacific silver fir | 91 | 48 | 52.7 |
| Subalpine fir | 7 | 4 | 57.1 |
| Noble fir | 7 | 4 | 57.1 |
| Douglas-fir | 230 | 27 | 11.7 |
| Lodgepole pine | 26 | 6 | 23.1 |
| Western white pine | 9 | -- | -- |
| Western redcedar | 85 | -- | -- |
| Western hemlock | 148 | -- | -- |
| Mountain hemlock | 36 | -- | -- |

[1/] Observed during a survey of all trees growing within a half chain each side of a 720-foot section of a powerline bisecting the study area.

The tally clearly showed that grouse preferred buds of true firs to those of other species, including Douglas-fir. Whether this preference was based on the attractiveness of true fir buds, their nutritive value, or availability was not ascertained. However, in California, Hoffmann (1961) found that in wintering areas Sierra blue grouse *(Dendragapus obscurus sierrae)* cropped white fir *(Abies concolor)* needles and buds only in the upper part of the trees. He analyzed white fir needle samples, collected from different heights and exposures, and found that needles from higher branches contained a significantly higher crude protein content. Hoffmann reasoned that grouse may

select them for that reason, although other considerations such as greater insolation and warmth may have played a part.

Apparently, Pacific silver fir does not recover as rapidly from this type of injury as other species (figs. 1 and 2). Top lateral

*Figure 2.--A subalpine fir and lodgepole pine with debudded terminal shoots. The subalpine fir (right) was one of the few true fir trees in the study area that showed apical elongation by a top lateral bud by the end of the growing season. In contrast, the damaged lodgepole pine (below,left), within several weeks (closeup below, right), showed rapid progress of lateral in assuming dominance over damaged terminal. Adventitious buds and subsequently new needles developed on the lodgepole pine damaged terminal towards the end of the growing season. None developed on any of the true firs.*

buds or branches began growing upward (apically) on all the injured Douglas-firs and lodgepole pines at the beginning of the 1964 growing season. Generally, the new terminal buds grew close enough to the wound of the old ones so little stem deformity and height growth loss should occur on these trees. This observation is supported by a recent assessment of deer damage on five Douglas-fir plantations on Vancouver Island. Animal feeding did not seriously affect the survival or height growth of young Douglas-firs (Mitchell 1964). Apical growth by top lateral buds or branches occurred only sporadically among the true firs. None was seen on Pacific silver firs.

These observations suggest that debudding is at least a localized problem in upper-slope forests, that damage to true fir is greater than to pine and Douglas-fir, and that hemlock and western redcedar may be left undamaged.

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